

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

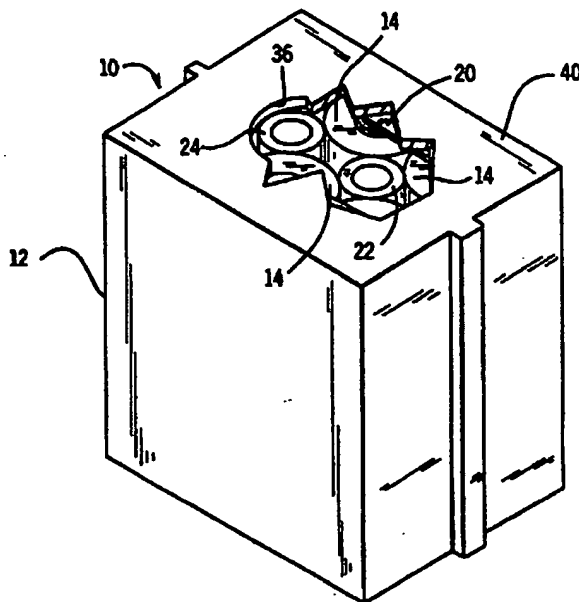
IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**



(21) (A1) **2,291,611**
(86) 1998/05/26
(87) 1998/12/10

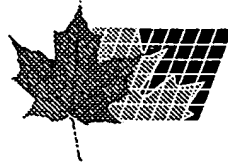
(72) PIERSON, JOHN R., US
(72) ANDREW, MICHAEL G., US
(72) BOLSTAD, JAMES J., US
(72) DALEY, JAMES T., US
(72) SEGALL, WILLIAM P., JR., US
(71) JOHNSON CONTROLS TECHNOLOGY COMPANY, US
(51) Int.Cl.⁷ H01M 2/10, H01M 2/30, H01M 2/22
(30) 1997/06/06 (08/870,803) US
(54) **BATTERIE DE STOCKAGE ELECTRIQUE MODULAIRE**
(54) **MODULAR ELECTRIC STORAGE BATTERY**



(57) Cette invention concerne une batterie de stockage électrique modulaire qui peut être utilisée lors de diverses applications. Cette batterie peut par exemple servir de batterie de démarrage, d'éclairage et d'allumage pour une voiture, un camion, une motocyclette, des outils de jardinage ou d'entretien des pelouses ou, encore, pour tout autre engin entraîné par un moteur à combustion interne. Cette batterie modulaire se compose de plusieurs cellules de batteries qui sont assemblées dans une enceinte. Ces cellules sont étanches, ne nécessitent aucun entretien et sont rechargeables. L'enceinte possède des bornes à connexion rapide, et les opérations de démarrage se font à l'aide d'une unité de base qui possède des bornes complémentaires. La batterie modulaire et l'unité de base possèdent également des éléments d'alignement en relief qui assurent une bonne interconnexion des bornes

(57) A modular electric storage battery is adaptable to a variety of applications, and for example, as a starting, lighting and ignition (SLI) battery of a car, truck, motorcycle, lawn and garden equipment or other internal combustion engine powered product. The modular battery is constructed from a plurality of battery cells assembled into a battery housing. The cells are sealed, maintenance-free, rechargeable cells. The housing includes quick connect termination, and the starting application is adapted with a base unit having complementary termination. The modular battery and base unit also include aligning features to ensure proper interconnection of the battery terminals. The base unit may be adapted to receive several sizes of modular battery. In addition, a second modular battery, that may be configured as a flashlight or other device, is provided and can be interconnected with the base unit to provide a





(21) (A1) **2,291,611**
(86) 1998/05/26
(87) 1998/12/10

de la batterie. L'unité de base est conçue pour recevoir des batteries modulaires de tailles différentes. Cette invention concerne également une seconde batterie modulaire, laquelle peut être conçue pour une lampe d'éclairage puissante ou pour tout autre dispositif, et peut se connecter à l'unité de base de manière à pouvoir effectuer le démarrage d'un véhicule dont la batterie est déchargée.

jump starting capability.

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

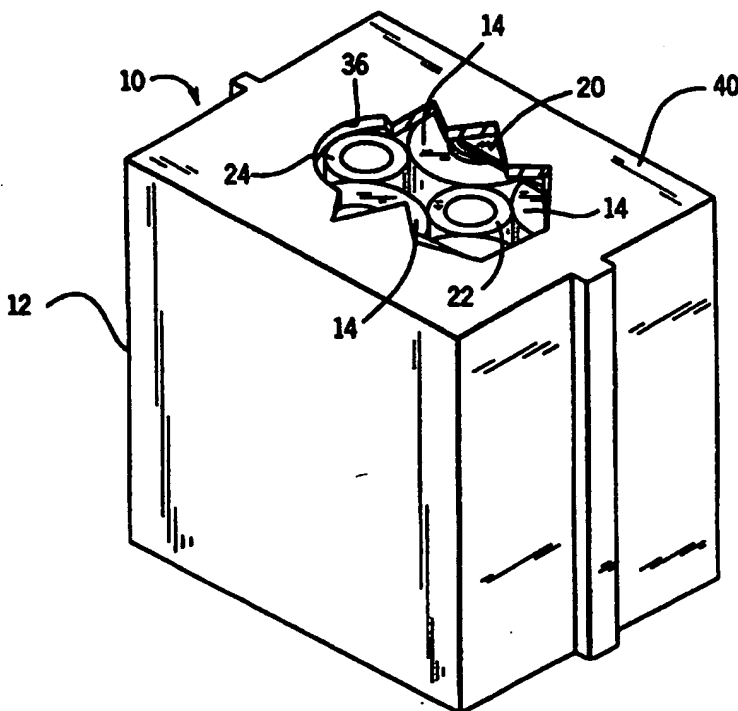
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H01M 2/10, 2/22, 2/30		A1	(11) International Publication Number: WO 98/56053
			(43) International Publication Date: 10 December 1998 (10.12.98)
(21) International Application Number: PCT/US98/10682		(74) Agent: RYSER, David, G.; Quarles & Brady, 411 East Wisconsin Avenue, Milwaukee, WI 53202-4497 (US).	
(22) International Filing Date: 26 May 1998 (26.05.98)			
(30) Priority Data: 08/870,803 6 June 1997 (06.06.97) US		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application US 08/870,803 (CIP) Filed on 6 June 1997 (06.06.97)		Published With international search report.	
(71) Applicant (for all designated States except US): JOHNSON CONTROLS TECHNOLOGY COMPANY [US/US]; 49200 Halyard Drive, Plymouth, MI 48170 (US).			
(72) Inventors; and (75) Inventors/Applicants (for US only): PIERSON, John, R. [US/US]; 13950 Forest Grove Road, Brookfield, WI 53005 (US). ANDREW, Michael, G. [US/US]; 9874 West Argon Road, Wauwatosa, WI 53226 (US). BOLSTAD, James, J. [US/US]; 2501 East Beverly Road, Shorewood, WI 53211 (US). DALEY, James, T. [US/US]; 225 West Bridge Street, Grafton, WI 53024 (US). SEGALL, William, P., Jr. [US/US]; 1672 Dellwood Court, Grafton, WI 53024 (US).			

(54) Title: MODULAR ELECTRIC STORAGE BATTERY

(57) Abstract

A modular electric storage battery is adaptable to a variety of applications, and for example, as a starting, lighting and ignition (SLI) battery of a car, truck, motorcycle, lawn and garden equipment or other internal combustion engine powered product. The modular battery is constructed from a plurality of battery cells assembled into a battery housing. The cells are sealed, maintenance-free, rechargeable cells. The housing includes quick connect termination, and the starting application is adapted with a base unit having complementary termination. The modular battery and base unit also include aligning features to ensure proper interconnection of the battery terminals. The base unit may be adapted to receive several sizes of modular battery. In addition, a second modular battery, that may be configured as a flashlight or other device, is provided and can be interconnected with the base unit to provide a jump starting capability.



CLAIMS

1. A system for providing electrical power to a device comprising:
a battery module having a housing containing at least one
electrochemical cell coupled to first and second terminals and being adapted to allow
access to the terminals, the housing also defining an alignment member;
5 a base unit having first and second terminal receptors and first and
second connectors opposed to and electrically coupled to the terminal receptors, the
connectors being adapted for electrical coupling to the device, the base unit also
having a complementary member sized to receive the alignment member;
wherein the battery module can be inserted into the base unit only if
10 the alignment member is engaged with the complimentary member, so that when the
battery module is within the base unit the first terminal is electrically coupled with the
first receptor and the second terminal is electrically coupled with the second receptor.
2. The system of claim 1 wherein the connectors are electrically coupled
to the device.
3. The system of claim 2 wherein the device comprises a starting circuit
for an internal combustion engine of an internal combustion engine powered device.
4. The system of claim 3 wherein the internal combustion engine powered
device comprises one of: a motor vehicle, a tractor, a motorcycle, an all-terrain
vehicle, a snowmobile, a marine craft, a lawn and garden power tool, and an aircraft.
5. The system of claim 4 wherein the base unit is adapted to be coupled to
either of a top terminal type connector and a side terminal type connector of the
starting circuit.

-16-

6. The system of claim 4 wherein the base unit includes an adapter, the adapter being configured to couple to one of a top terminal and a side terminal type connector of the starting circuit.
7. The system of claim 2 wherein the device comprises an uninterrupted power supply system.
8. The system of claim 2 wherein the device comprises a power system of a hybrid electric vehicle.
9. The system of claim 2 wherein the base unit is formed integral with the device.
10. The system of claim 2 wherein the electrochemical cell comprises a spiral wound thin metal film cell.
11. The system of claim 2 wherein the battery module comprises a plurality of electrochemical cells, the cells being coupled to each other and to the terminals.
12. The system of claim 2 wherein the aligning member comprises at least one ridge member formed in the housing and a complementary channel member formed in the base unit for each ridge member.
13. The system of claim 1 wherein the battery module is adapted to one of a plurality of capacities.
14. The system of claim 13 wherein the aligning member retains substantially identical physical attributes for each of the plurality of capacities.

-17-

15. The system of claim 14 wherein the first and second terminals are in spaced relationship to the aligning member for each of the plurality of capacities.

16. The system of claim 15 wherein the terminals are aligned with the aligning formation for each of the plurality of capacities.

17. The system of claim 13 wherein the base unit is adapted to accept battery modules of each of the plurality of capacities.

18. The system of claim 1 wherein the housing has apertures for allowing access to the terminals and the terminals are recessed within the housing.

19. The system of claim 2 further comprising:

a second base unit having first and second terminal receptors and first and second connectors opposed to and electrically coupled to the terminal receptors, the connectors being electrically coupled to the device; and

5 a second battery module having at least one electrochemical cell coupled to first and second terminals, and a housing containing the at least one electrochemical cell and the terminals, the housing being adapted to allow access to the terminals;

10 wherein the second battery module includes an aligning member formed in the housing, the aligning unit adapted to engage a complementary member formed in the second base unit such that when the aligning members of the second battery module and the second base unit are engaged the first terminal is electrically coupled with the first receptor and the second terminal is electrically coupled with the second receptor.

20. The system of claim 19 wherein the second battery module is interchangeable with the battery module.

-18-

21. The system of claim 19 wherein base unit is adapted to receive the second battery module.

22. The system of claim 19 wherein the second battery module is adapted for use with one of a lighting device, a sound device, a thermal device, an electronic device, an electromechanical device, and a computing device.

23. The system of claim 19 wherein the second battery module is adapted with one of a removable lighting device, a removable sound device, a removable thermal device, a removable electronic device, a removable electromechanical device, and a removable computing device.

24. A modular battery system for internal combustion engine starting comprising:

a battery module having a housing containing at least one electrochemical cell coupled to first and second terminals and being adapted to allow
5 access to the terminals, the housing also defining an alignment member;

a base unit having first and second terminal receptors and first and second connectors opposed to and electrically coupled to the terminal receptors, the connectors being electrically coupled to a starting and charging circuit of an internal combustion engine, the base unit also having a complementary member sized to
10 receive the alignment member;

wherein the battery module can be inserted into the base unit only if the alignment member is engaged with the complimentary member, so that when the battery module is within the base unit the first terminal is electrically coupled with the first receptor and the second terminal is electrically coupled with the second receptor.

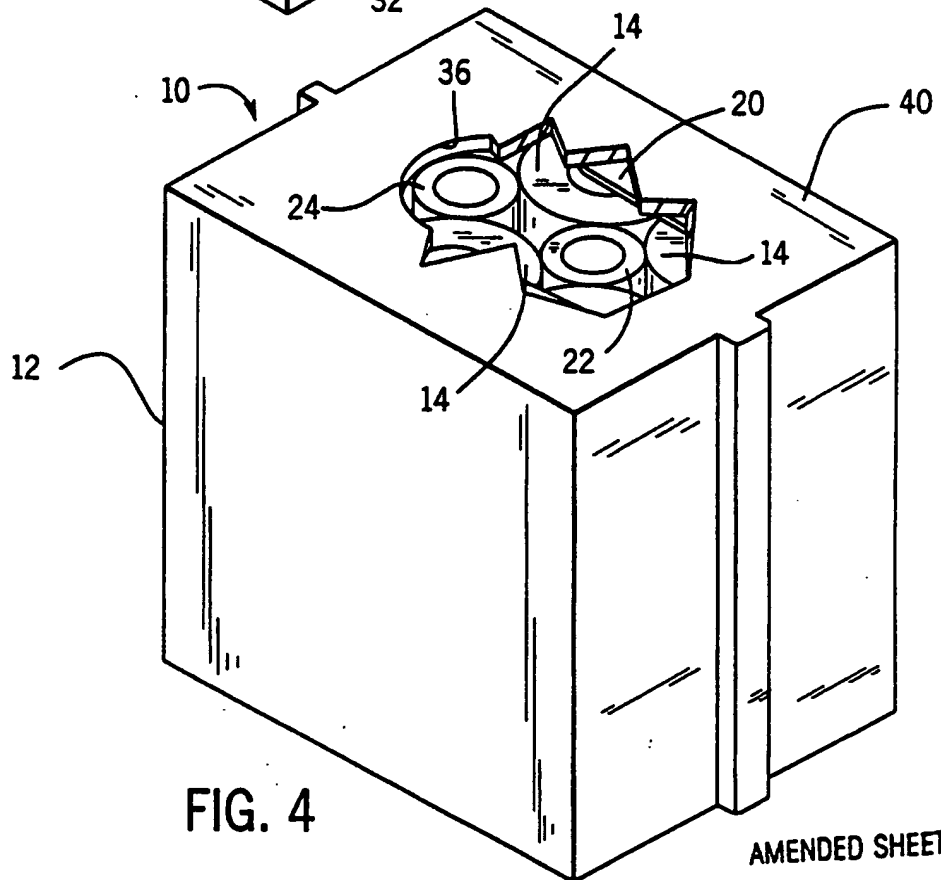
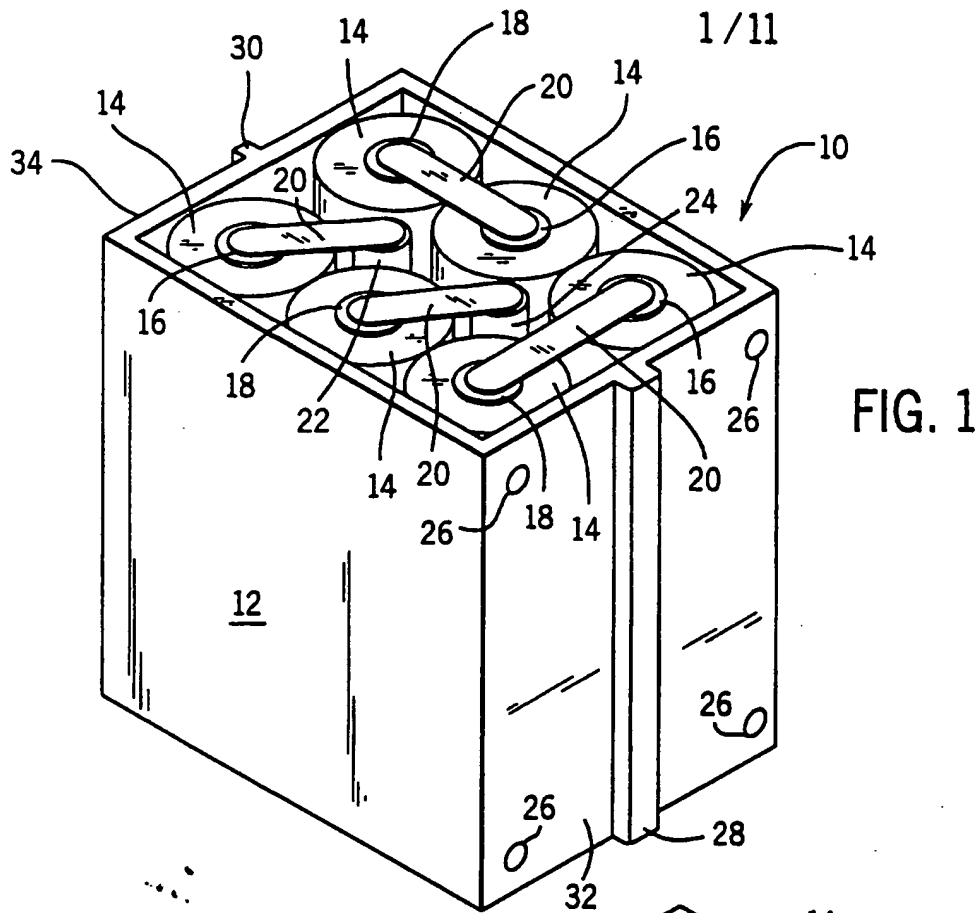
25. The modular battery system of claim 24 wherein the electrochemical cell comprises a spiral wound thin metal film cell.

-19-

26. The modular battery system of claim 24 wherein the battery module comprises a plurality of electrochemical cells, the cells being coupled to each other and to the terminals.
27. The modular battery system of claim 25 wherein the first and second connectors comprise first and second battery cables adapted for connection to the starting circuit.
28. The modular battery system of claim 24 wherein the aligning member comprises at least one ridge member formed in the housing and a complementary channel member formed in the base unit for each ridge member.
29. The modular battery system of claim 24 wherein the battery module is adapted to one of a plurality of capacities.
30. The modular battery system of claim 29 wherein the aligning member retains substantially identical physical attributes for each of the plurality of capacities.
31. The modular battery system of claim 30 wherein the base unit is adapted to accept battery modules of each of the plurality of capacities.
32. The modular battery system of claim 30 wherein the first and second terminals are in spaced relationship to the aligning member for each of the plurality of capacities.
33. The modular battery system of claim 32 wherein the terminals are aligned with the aligning member for each of the plurality of capacities.
34. The modular battery system of claim 24 wherein the housing has apertures for allowing access to the terminals and the terminals are recessed within the housing.

-20-

35. The modular battery system of claim 24 further comprising:
a second base unit having first and second terminal receptors and first and second connectors opposed to and electrically coupled to the terminal receptors, the connectors being electrically coupled to the starting circuit of the internal combustion engine; and
a second battery module having at least one electrochemical cell coupled to first and second terminals, and a housing containing the at least one electrochemical cell and the terminals, the housing being adapted to allow access to the terminals;
- 10 wherein the second battery module includes an aligning member formed in the housing, the aligning member adapted to engage a complementary member formed in the second base unit such that when the aligning members of the second battery module and the second base unit are engaged the first terminal is electrically coupled with the first receptor and the second terminal is electrically coupled with the second receptor.
- 15
36. The modular battery system of claim 35 wherein the second battery module is interchangeable with the battery module.
37. The modular battery system of claim 35 wherein base unit is adapted to receive the second battery module.
38. The modular battery system of claim 35 wherein the second battery module is adapted for use with one of a lighting device, a sound device, a thermal device, an electronic device, an electromechanical device, and a computing device.
39. The modular battery system of claim 35 wherein the second battery module is adapted with a removable lighting device, a removable sound device, a removable thermal device, a removable electronic device, a removable electromechanical device, and a removable computing device.



2 / 11

FIG. 2

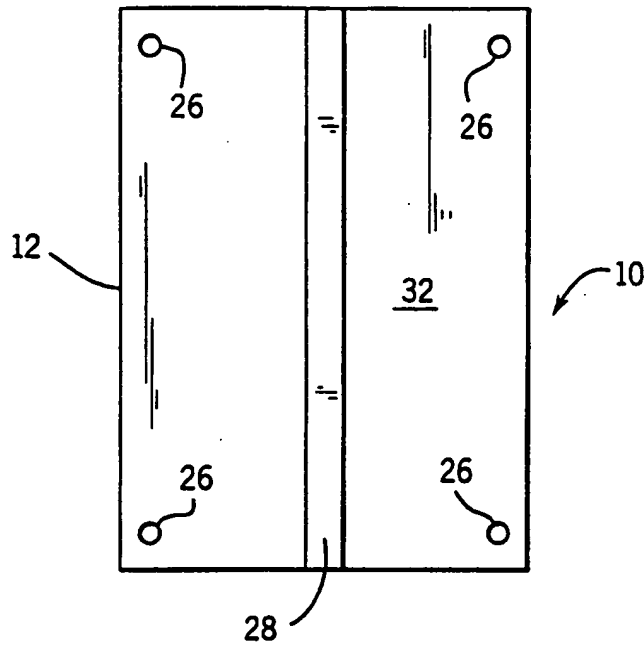
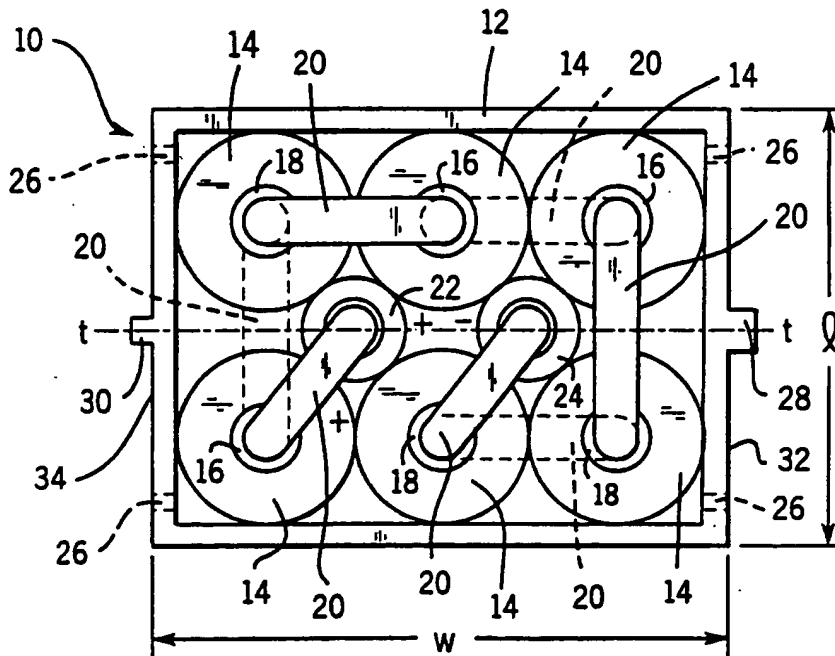
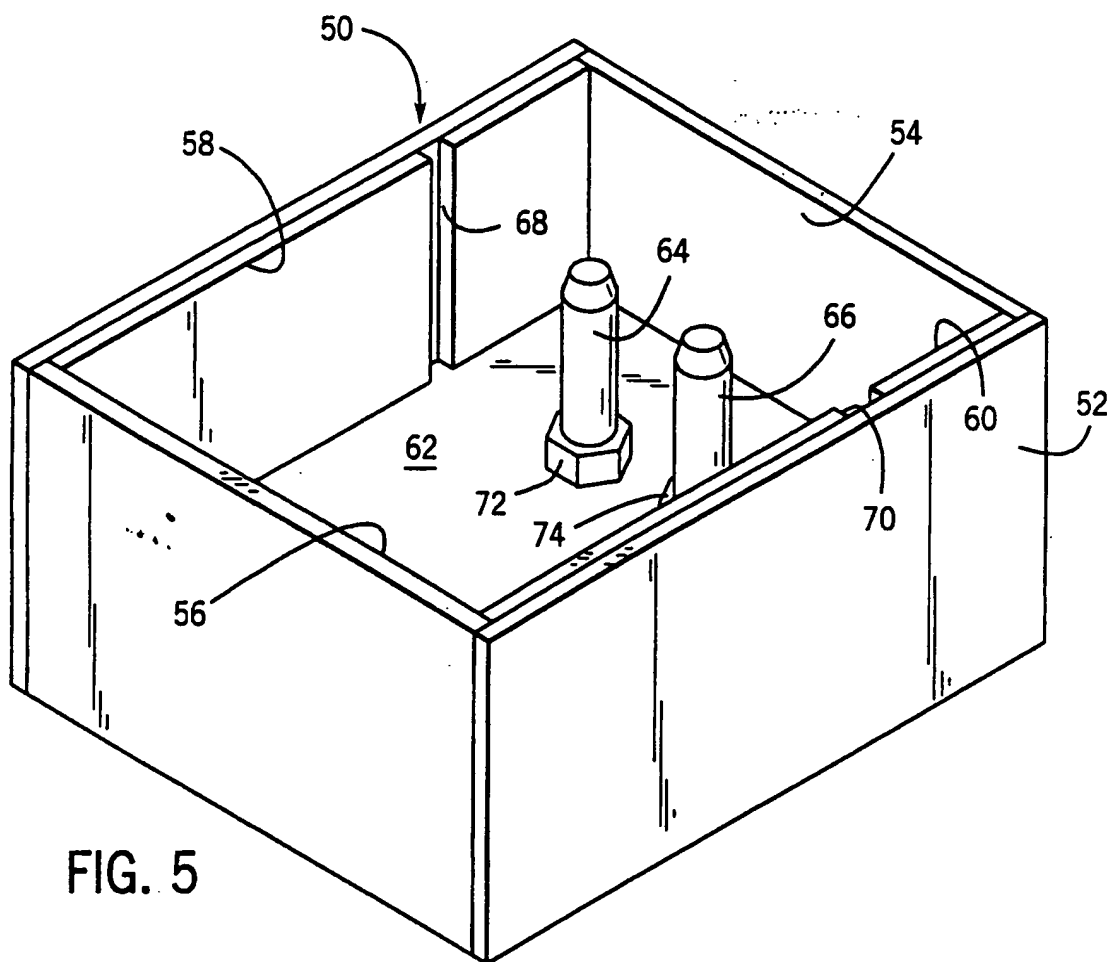


FIG. 3





4 / 11

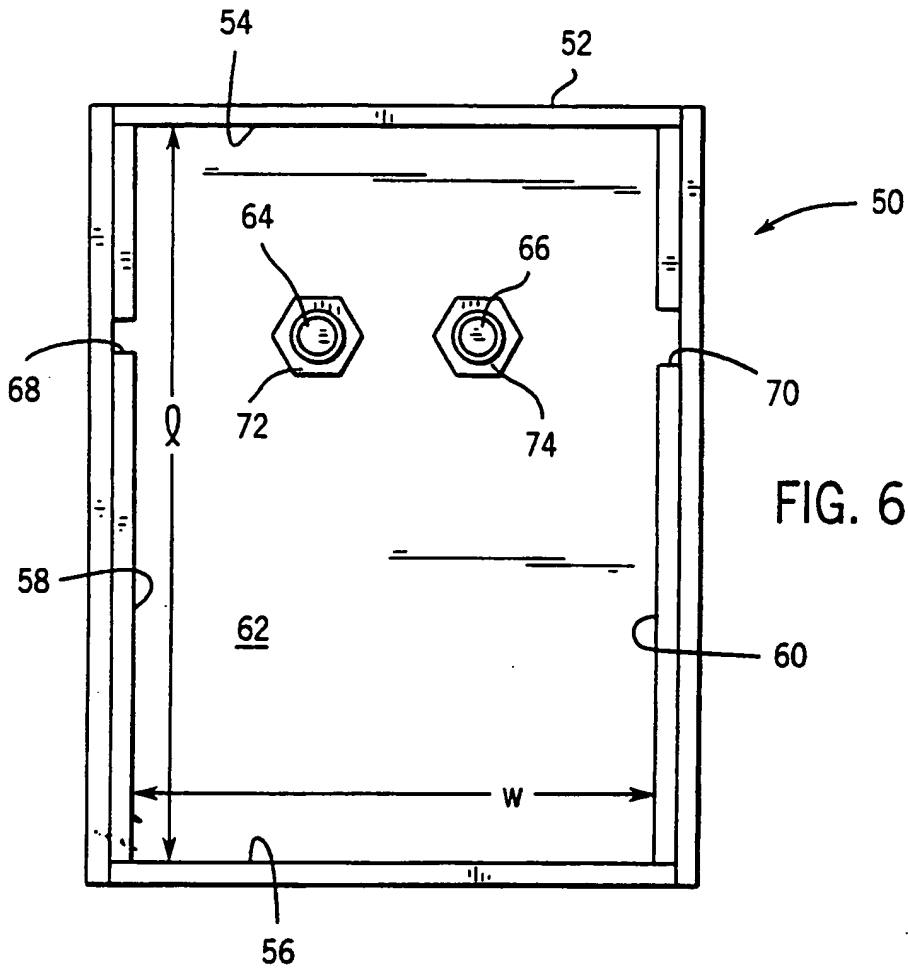


FIG. 6

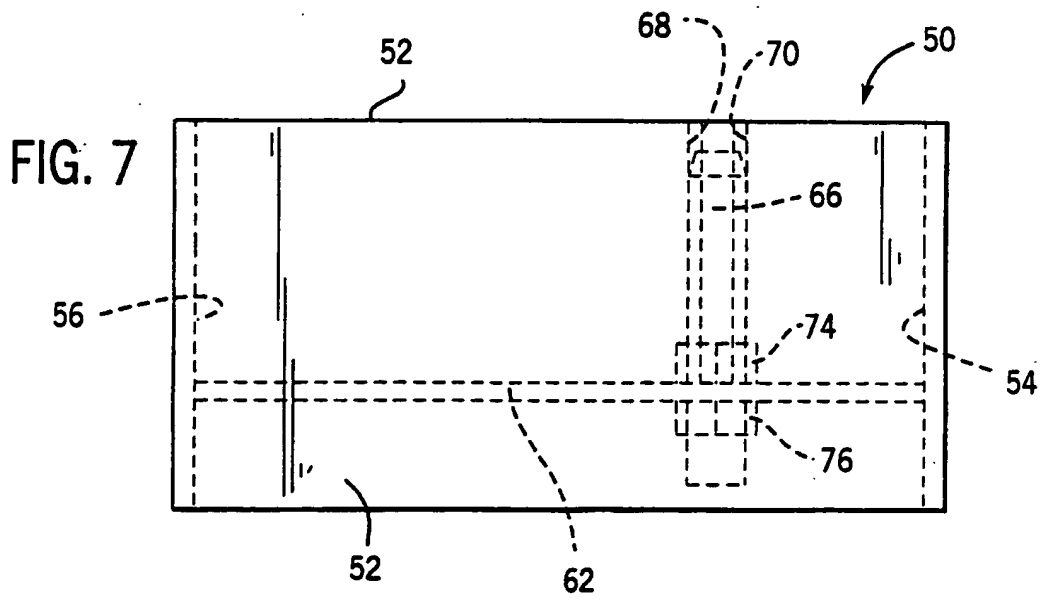


FIG. 7

AMENDED SHEET

5 / 11

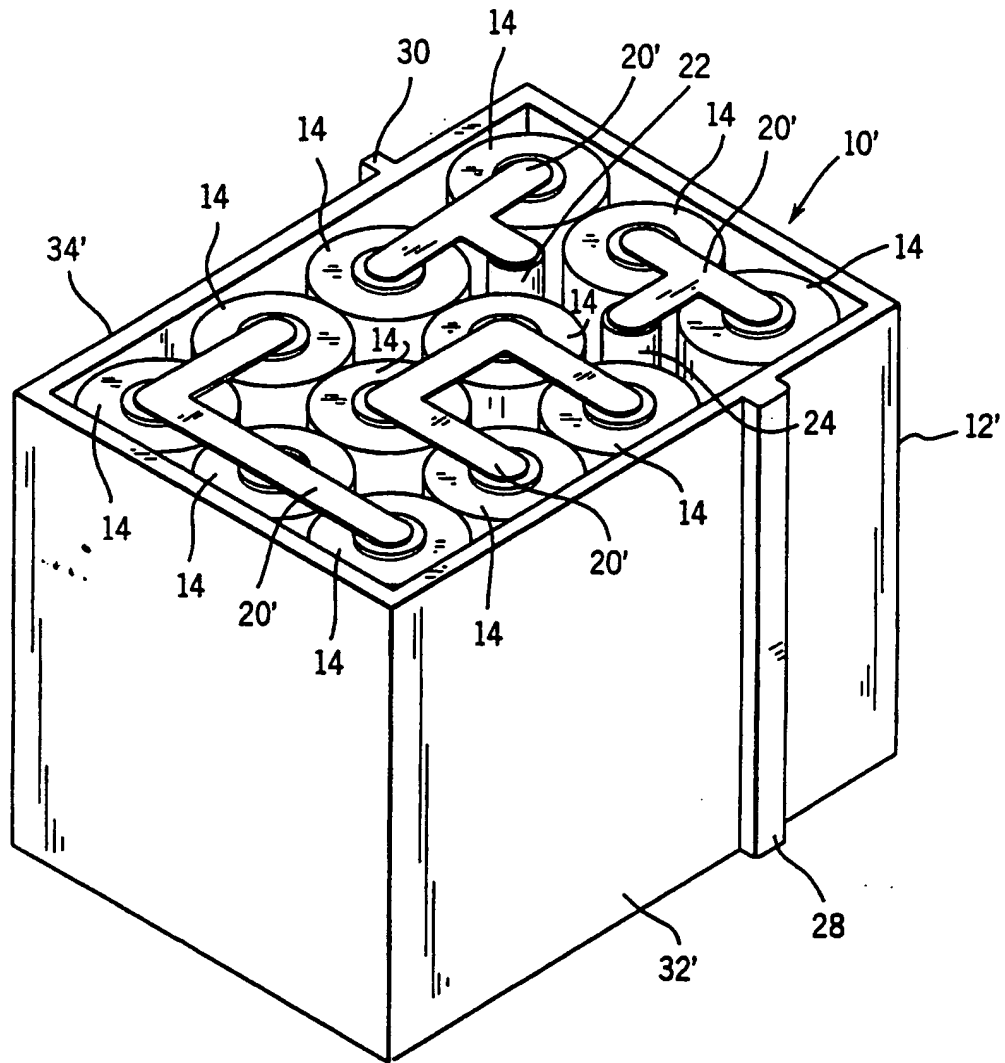


FIG. 8

6 / 11

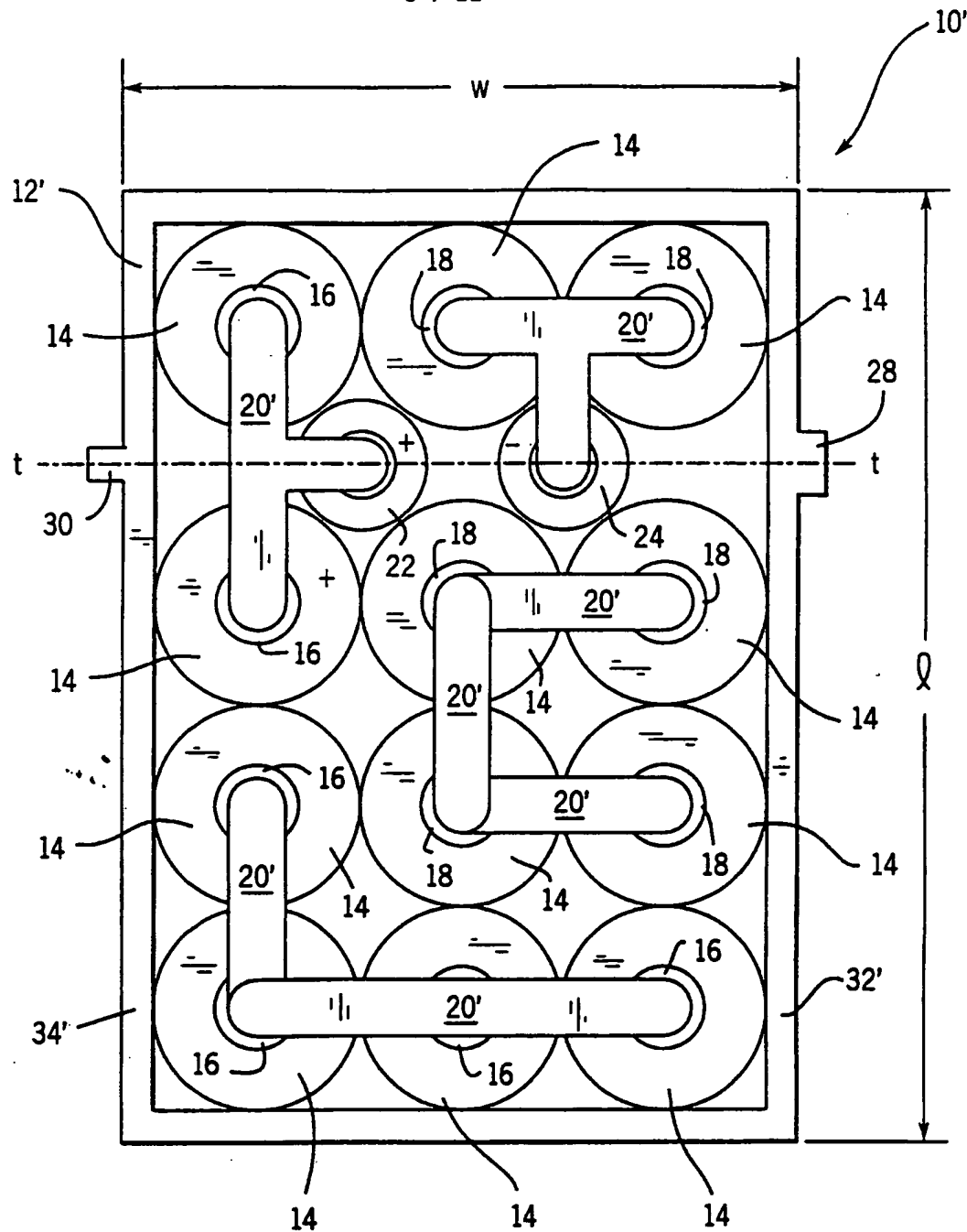


FIG. 9

FIG. 10

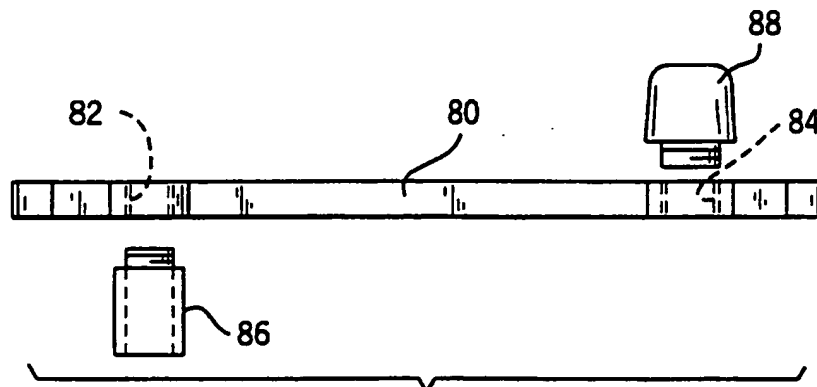
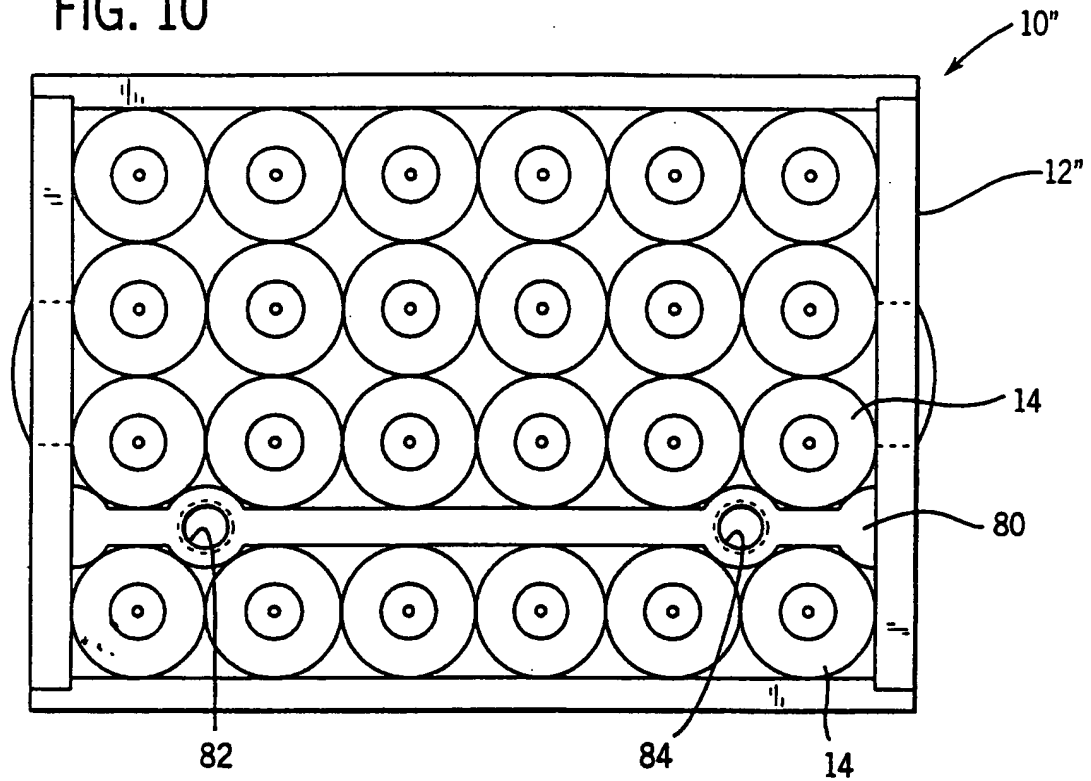


FIG. 11

8 / 11

FIG. 12

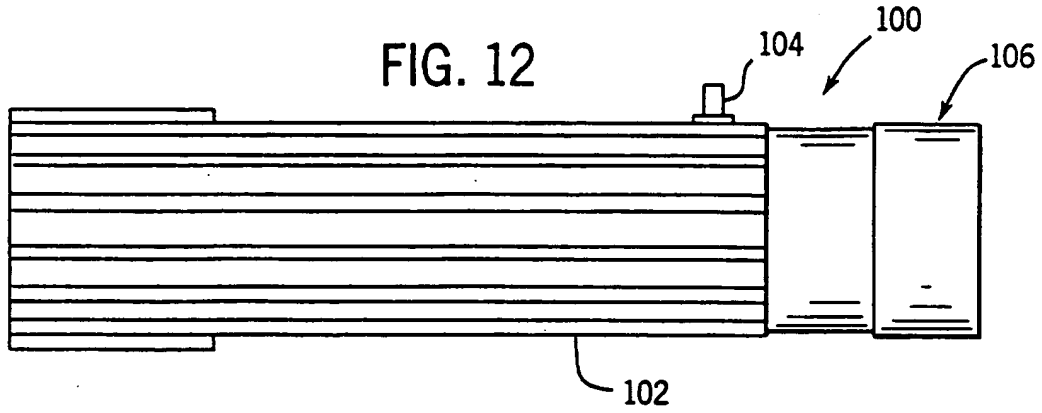


FIG. 13

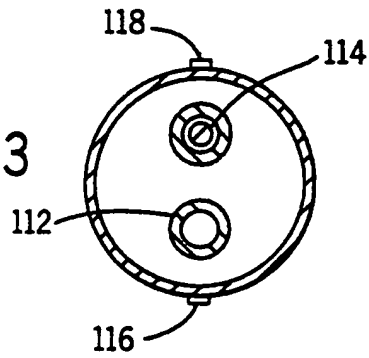


FIG. 14

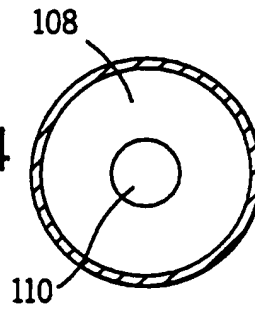


FIG. 16

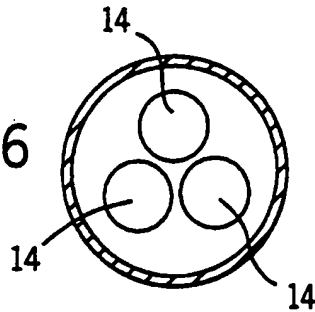
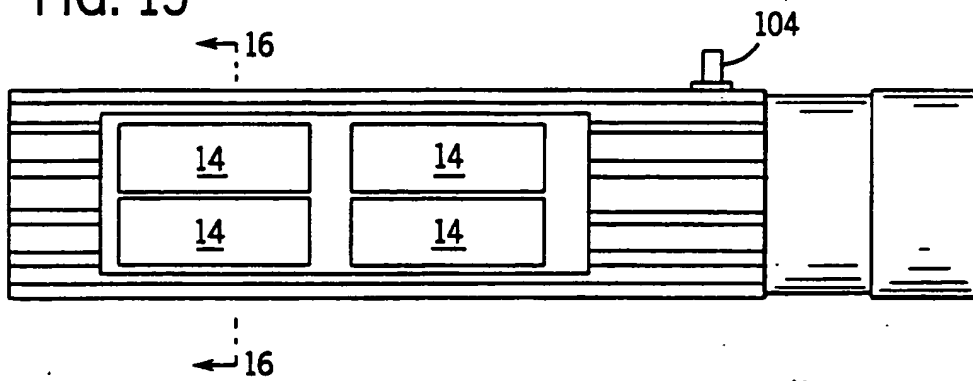


FIG. 15



AMENDED SHEET

9 / 11

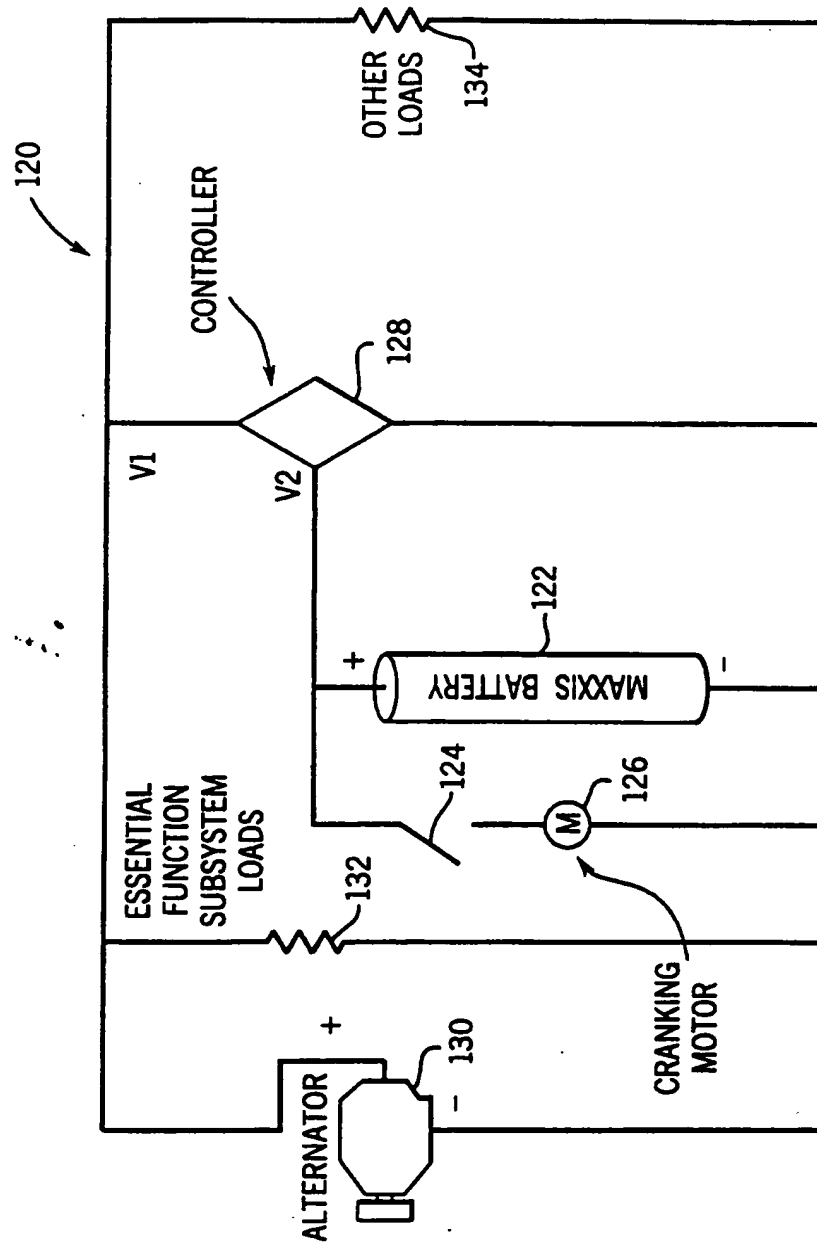


FIG. 17

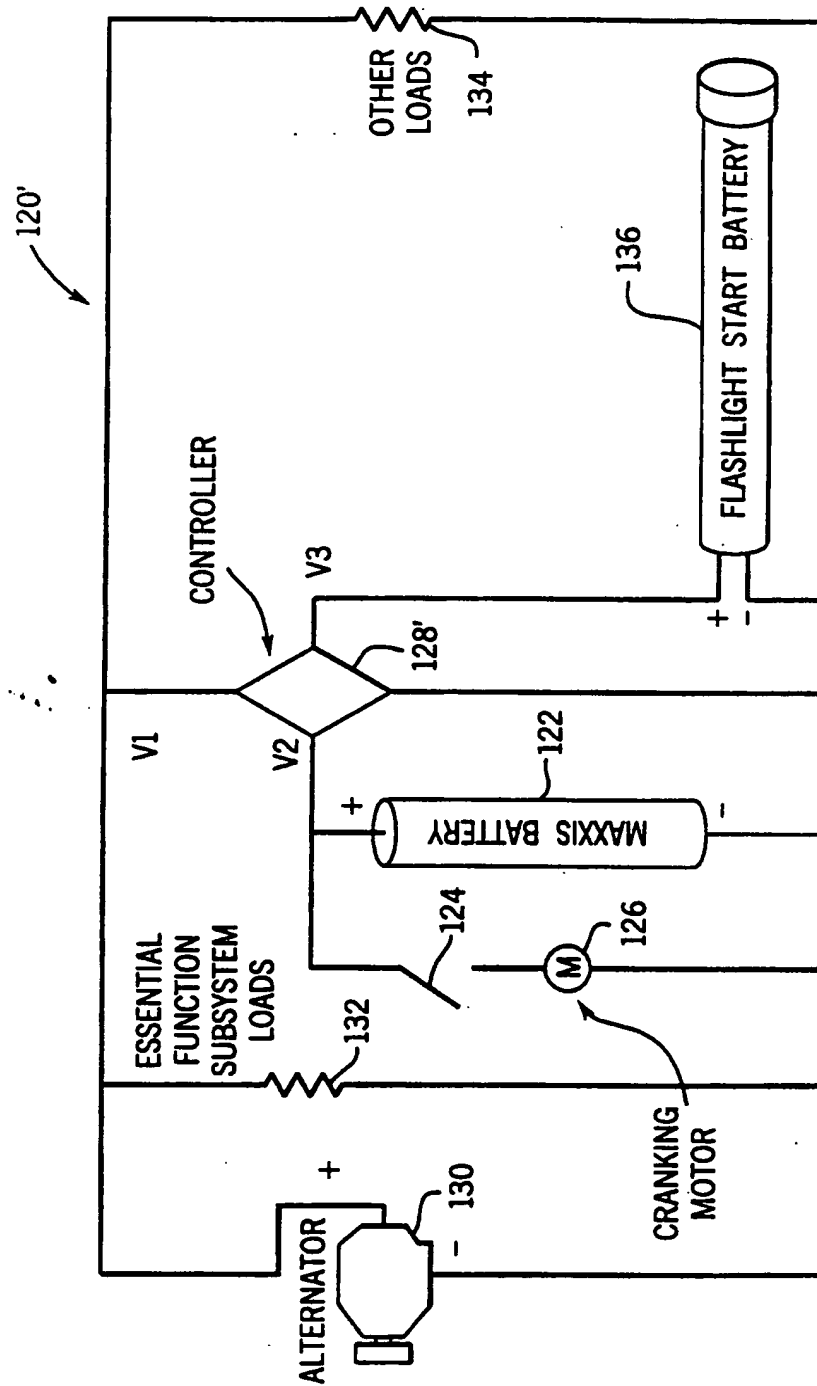


FIG. 18

11 / 11

FIG. 19

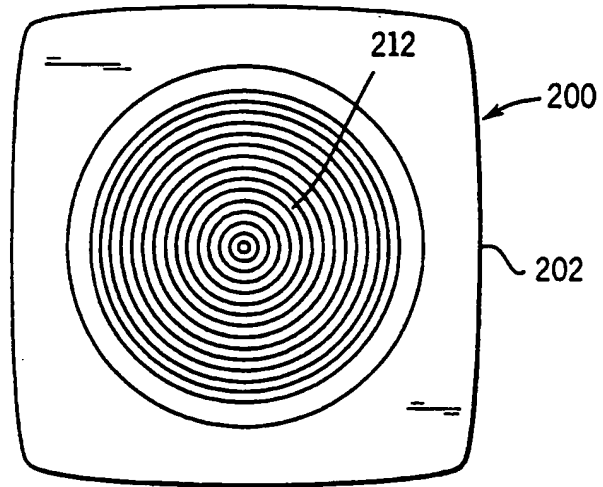


FIG. 20

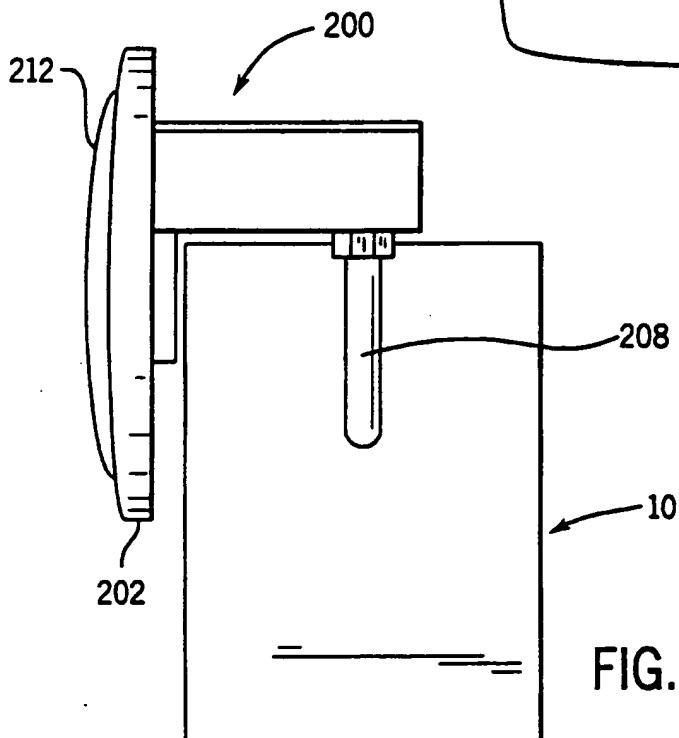
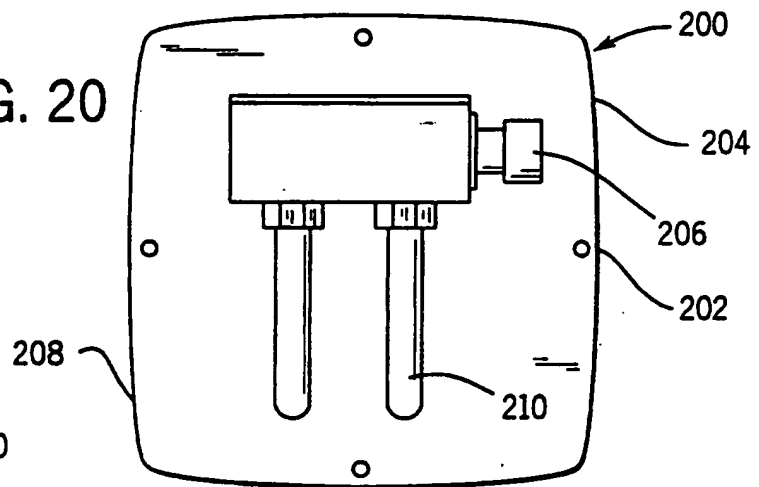


FIG. 21